

**Draft**

**Supplemental Environmental Project**

**for Lahontan Regional Water Quality Control Board**

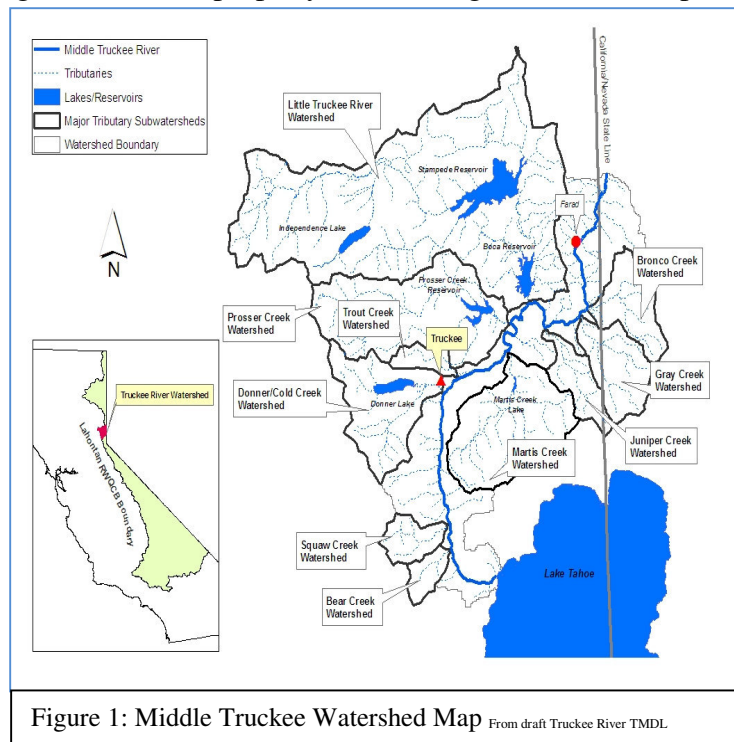
(Waddle Ranch Watershed Improvement Program)

Prepared by Michael Hogan, IERS, Inc. on behalf of Northstar Mountain Properties, LLC  
May 13<sup>th</sup>, 2008

## Executive Summary

As part of a proposed settlement for water quality violations, Northstar Mountain Properties, LLC is submitting this Supplemental Environmental Project to improve water quality and biological resources. The improvements will be phased over five years at the Waddle Ranch, which is in the same watershed as the violations occurred (see Figure 1) and is owned and managed by the Truckee Donner Land Trust. The exact improvements will be defined collaboratively by an advisory group that will include representatives from the Truckee River Watershed Council, Truckee Donner Land Trust, Northstar Mountain Properties, Integrated Environmental Restoration Services the Lahontan Regional Water Quality Control Board. The improvements will include projects within the following three categories: road and upland restoration, stream restoration and forest fuel removal.

Targeted, real-time monitoring will be conducted at each project before and after treatments. In-stream water quality monitoring will also be conducted to measure reductions in sediment loading for the entire property. Monitoring results will help fill critical gaps in understanding the impacts of various treatments and management activities on erosion and water quality and validate a set of treatment tools. Technology transfer is also a key component of the project. Two handbooks will be produced to assist land managers and owners within the Sierra Nevada in planning, implementing and monitoring watershed improvement and forest fuels reduction projects.



## Part 1: Introduction and Location Maps

The Waddle Ranch Watershed Improvement Program Supplemental Environmental Project (SEP) is designed to enhance and improve watershed conditions within the Waddle Ranch property, located in the Martis Valley, eastern Placer County, California. Further, this project is intended to serve as a model for other watershed activities in the region. This project has been triggered by water quality violations incurred by contractors working for Northstar Mountain Properties, LLC (NMP) on their property at Northstar-at-Tahoe during the 2006 construction season. This SEP will be funded by NMP as a result of those violations and is being implemented in an attempt to offset environmental impacts related to some of those violations. The SEP is designed and managed such that overall water and environmental quality will be improved in the same watershed as Northstar-at-Tahoe, which is the Martis Valley. The location of these improvements is the Waddle Ranch, which is owned by the Truckee Donner Land Trust (TDLT) (see Figure 2). The planned improvements will be demonstrated using quantitative measurement in three key areas: 1) road removal, 2) stream restoration/improvement, and 3) forest fuels management.

Beyond the obvious water quality and biological benefits produced by this SEP, the project is designed to fill two significant gaps in watershed restoration and management: 1) an erosion-focused, rapid watershed assessment methodology that is user-friendly and cost effective and 2) a science-based program for fuels reduction efforts that focuses on erosion/water quality impacts of those efforts. The first product will be a guidebook to provide land managers, land trust staff, watershed councils, agency staff and others with a direct, accessible and cost effective method of evaluating, repairing and monitoring watersheds and sub-watersheds for water quality related issues.

The second product is a set of science-based guiding principles and an adaptive management process for addressing forest fuels treatments that directly incorporates water quality protection. This product is based on the Sediment Source Control Handbook process

([www.swrcb.ca.gov/rwqcb6/cerec.html](http://www.swrcb.ca.gov/rwqcb6/cerec.html)).

These guiding principles and toolbox would be the first stage in a larger effort to produce a highly useful handbook. This larger effort is supported by the Lahontan Regional Water Quality Control Board (LRWQCB) staff and a broad range of stakeholders including Lake Valley, Meeks Bay and Northstar Fire districts as well as the Lake Tahoe Regional Fire Chiefs Association, Tahoe Regional Planning Agency (TRPA) staff and others.

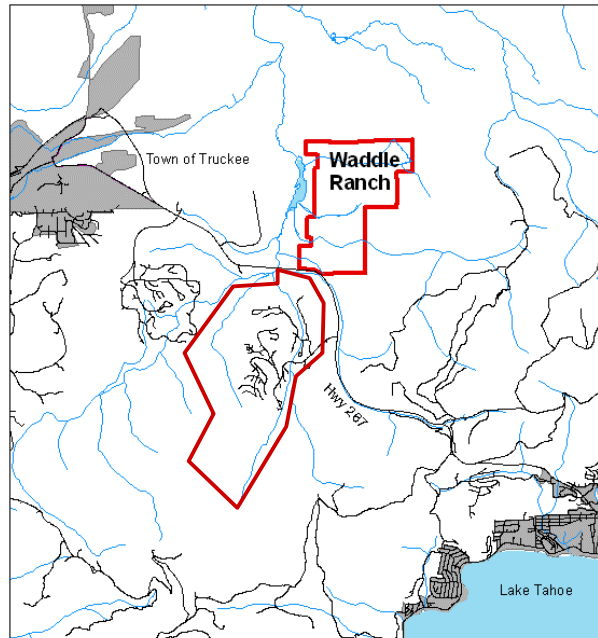


Figure 2 Location of Waddle Ranch and Northstar

Both of these handbooks produced by the SEP build on work done by Integrated Environmental (IERS) over the last decade. This work has incorporated true adaptive management into field projects and provides a process for quantitative assessment and continual improvement for erosion and water quality issues throughout the Sierra Nevada. Integrated Environmental Restoration Services, Inc. (IERS), the preparer of this document and the contractor to Northstar Mountain Properties for SEP implementation, has created and continues to evolve collaborative, science-based products that fill critical knowledge and/or process gaps, as exhibited in the Sediment Source Control Handbook (see link, above). The handbook has been a collaborative effort between the Lahontan RWQCB, six California Ski Resorts, the US Forest Service and other stakeholders.

The SEP allocates the majority of funding to on-the-ground, direct water quality improvements (almost 80% of the budget is dedicated to this work). Without the funding provided by the SEP, the work needed to provide these direct water quality improvements in the Martis Creek watershed, the same watershed as Northstar-at-Tahoe, would take a decade or more to complete. The SEP funding will result in immediate improvements to the water quality and biological resources in the Martis Valley. SEP-funded improvements will take place over five years and are designed to provide the foundation for continued watershed management efforts at the Waddle Ranch.

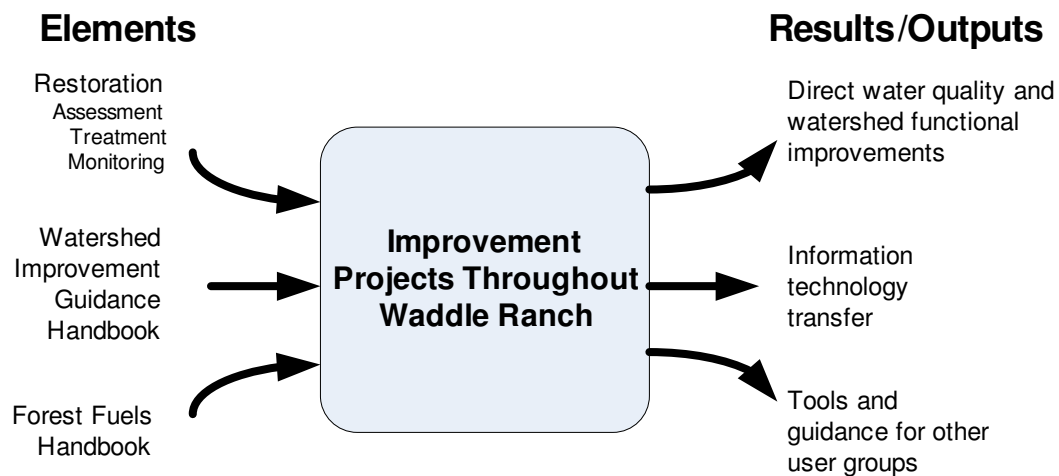


Figure 3: Diagram indicating relationships between the Waddle Ranch projects, results at Waddle Ranch and beyond.

## Part 2: General Project Description

The Northstar Mountain Properties Waddle Ranch Watershed Improvement Program is structured as a Supplemental Environmental Project. This SEP is designed to be

implemented as a truly adaptive management project<sup>1</sup> in that it will integrate goal setting, engagement of appropriate partners and stakeholders, planning, implementation, monitoring, management response where necessary and targeted information sharing. It is designed to apply a broad range of techniques, processes and practices for upland restoration, stream zone restoration and forest fuels management while at the same time filling information gaps within those practices.

The task of effective watershed assessment, treatment and monitoring is often overwhelming for many land managers. This project is intended to serve as a functional, understandable, working model for the many Land Trusts, Watershed Councils and landowners across the Sierra Nevada.

### **Waddle Ranch Watershed Improvement Program Elements:**

#### **Waddle Ranch Restoration Improvements (79% of budget)**

The focus of the proposed SEP is restoration of impacted areas of Waddle Ranch in the Martis Valley. Waddle Ranch has been selected due to its location in the same watershed as Northstar, the similarity of types of improvements needed and the overall value of restoration on that site to the region. Work on the Waddle Ranch is supported by significant public interest. The Waddle Ranch is a recently purchased property that includes a great deal of open space and public access in the Martis Valley. Projects in this watershed are expected to improve water quality in the East Fork of Martis Creek, which enters Martis Reservoir just below the project area. Projects under the proposed SEP will complement other projects such as the Martis Creek Restoration Project. The SEP will use an adaptively managed process to set goals, plan, implement and monitor watershed improvements and will disseminate the information gained through site tours and two handbooks (described below).

The watershed improvement process will focus on water quality related to erosion and forest management. Specifically, watershed improvement will entail the Erosion-focused Rapid Assessment (EfRA) process, field verification of problem (sediment producing) areas, treatment/restoration of problem areas identified in the EfRA and post treatment monitoring of those areas for quantification of improvement. Monitoring will be based on strategies developed elsewhere and will include: 1) real-time and indicator measurement of several functional parameters in the treatment area, including infiltration, runoff, sediment production and a range of soil and vegetation parameters and 2) water quality monitoring above and below project areas. The functional monitoring processes are similar to and based on those used to develop portions of the Lake Tahoe Total Maximum Daily Load (TMDL) implementation strategies. Background monitoring is planned to begin in the spring of 2008, dependant on funding initiation.

#### **Watershed Evaluation, Treatment and Monitoring Handbook (3% of budget)**

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<sup>1</sup> This process is described in detail in the Sediment Source Control Handbook <http://www.swrcb.ca.gov/rwqcb6/cerec.html>

This element of the SEP involves the development and application of a systematic, cost-effective and transferable approach to watershed evaluation, treatment and monitoring. This document will fill a void that currently exists and will provide land managers and agencies with a user-friendly process to: 1) focus watershed assessment on erosion problem areas, 2) provide an adaptive management-based planning and implementation guidance process and 3) provide clear direction on how and what to monitor in order to quantitatively assess impacts of watershed improvement efforts. This handbook and process is directly applicable to TMDL implementation<sup>2</sup> within and beyond the Martis Valley and Middle Truckee River.

#### **Forest Fuels Treatment/Water Quality Protection Handbook (6% of budget)**

This portion of the project will define an adaptive management approach to fuels treatment and forest management with special emphasis on water quality protection and prevention of erosion. This handbook will be based on the Sediment Source Control Handbook and will use a similar adaptive, collaborative process to define and achieve goals. Deliverables will be a set of guiding principles for forestry practices with a foundation in adaptive environmental management, a 'toolbox' for fuels reduction and forest management that quantifies the impacts and potential impacts on water quality and a set of related mitigation procedures where applicable. This portion of the project is designed to serve as a foundation for a more robust understanding of the impacts of forest fuels treatments currently underway or planned for the Tahoe-Truckee region. If used appropriately, this handbook will help maintain or improve water quality while allowing land managers to implement cost-effective fuels reduction treatments.

The funding from this SEP will additionally serve as seed money for a more robust, region-wide Forest Fuels and Erosion Management Handbook which can be used throughout the region. Potential funding has already been identified from a number of other sources and interest groups including the Nevada Fire Safe Council (John Pickett), the Truckee-Tahoe Fire Chiefs Association (Mark Shadowans, Chief, Northstar FPD, President, John Pang, Meeks Bay FPD) and other private land holders and entities. Funding has also been requested from the Sierra Nevada Conservancy to enhance this handbook (final response pending).

### **Nexus Discussion**

#### **Nexus to Violations**

During the summer and fall of 2006, a number of technical violations were noted and notices of violation issued by Water Board staff on NMP projects at Northstar. During November of 2006, turbid discharges related to technical violations were noted and a Clean Up and Abatement Order was issued by the Water Board. The extent of discharge and impacts to water bodies is difficult to ascertain but it is clear that turbid water entered Martis Creek. The vast majority of violations prior to November were technical in nature. This SEP is designed to offset impacts to

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<sup>2</sup> TMDL is an acronym for Total Maximum Daily Load. Essentially, TMDL is the estimated amount of pollutant that can enter a water body without causing long term impairment. This recently developed regulatory tool is being used to attempt to help a number of water bodies to recover. The Middle Truckee River, into which Martis Creek flows, is in the process of developing a TMDL.

beneficial uses through 1) direct improvement to the Martis Creek watershed and 2) development of two handbooks that will assist other developers and land managers in understanding the technical nature of erosion potential and to implement watershed protection and improvements projects.

Note: IERS and NMP developed and produced a SWPPP Handbook in 2007, which was ‘above and beyond’ water quality BMP requirements. This handbook was developed in direct response to lack of clear understanding by contractors and contract managers of the requirements and implications of water quality regulations. This lack of understanding has been noted across the construction industry. While this Handbook is not part of this SEP, it served to offset the lack of understanding by construction personnel at Northstar in 2006 and demonstrates NMP’s desire to improve the effectiveness of their water quality protection efforts. The SWPPP Handbook is available and has been distributed by Water Board staff to other dischargers in the Lahontan region. The SWPPP Handbook serves as an example of the two handbooks that are proposed as part of this SEP. The impetus of these handbooks is to translate experience gained in achieving watershed protection and improvement into information widely available and useable by others.

**Nexus to other regional projects.** The Waddle Ranch Watershed Improvement Program is designed to be complementary to other projects in the Martis-Truckee region. For example, the Truckee River Watershed Council (TRWC) has received funding (\$150,000) under Prop 50 IRWMP Implementation (as part of the Tahoe Sierra Partnership) for Truckee River TMDL monitoring. These efforts will be coordinated with the Waddle Ranch SEP through the TRWC.

Forest fuels management efforts are increasing in intensity throughout the Lahontan Region. Preparation of the Forest Fuels Treatment/Water Quality Protection Handbook will encompass the development of a steering group that will serve to coordinate this and other efforts beyond the Martis Valley. This handbook will include a set of guiding principles that can be used across the Truckee-Tahoe region as guidance for fuels reduction efforts that will focus on erosion protection.

The Middle Truckee River TMDL will include implementation of treatments to reduce sediment loading. TMDL implementation has been problematic in cases where clear guidance as to approach, goal setting, implementation and monitoring is not available. The Watershed Evaluation, Treatment and Monitoring Handbook will provide this guidance.

Placer County and the Town of Truckee are in the process of developing Stormwater Management Plans. While the Waddle Ranch is not an urbanized watershed, many of the assessment issues are similar. Further, source control approaches can be very similar between the two types of landscape. This SEP program will be coordinated with those efforts through the TRWC. Further, water quality monitoring efforts on the Middle Truckee River will be coordinated to the greatest extent possible with this SEP, also through the TRWC.

All efforts within this SEP will be coordinated with the TRWC (who assisted in developing this description document and are primary collaborators), the Regional Board, the Truckee Donner Land Trust (TDLT) and other stakeholders as appropriate.

A SEP Advisory Group will be formed which will include, at a minimum, Lisa Wallace from the Truckee River Watershed Council, Sara Taddo from the Truckee Donner Land Trust, Hayes Parzybok from Northstar Mountain Properties, Michael Hogan from IERS and a representative from the Lahontan Regional Water Quality Control Board, with Susan Clark from Dynamic Competence facilitating the process. This core group will collaborate with other team members as appropriate. The TRWC and the SEP Advisory Group will coordinate and leverage all tasks between the TMDL, the Cumulative Effects Monitoring and other ongoing related efforts.

## **Part 3: Work Plan**

### **Description of Key Tasks and Work Items**

**Work Item 1: Project Initiation** This work item will begin actual coordination of the SEP with the appropriate parties.

#### **1.1 SEP Advisory Group Development and Facilitation**

A SEP Advisory Group will be formed that will offer input into the entire SEP project. In this process, we will clarify and agree on project goals and discuss steps needed to achieve those goals. The SEP Advisory Group will be a small working group that will also develop a strategy for keeping appropriate groups and individuals (stakeholders) connected to and apprised of this project.

#### **1.2 SEP Advisory Group Meetings (3)**

We intend to hold three meetings per year for the life of this SEP unless the Advisory Group determines that we need either less or more meetings.

#### **1.3 SEP Advisory Group Coordination**

This work item is for coordination of the SEP Advisory Group between actual meetings and will entail such tasks as phone, email and web updates, coordination of group activities, concerns and discussions between meetings.

#### **1.4 Review and Integration of Pertinent Martis Valley Projects**

There are a number of planned and ongoing projects in the Martis Valley that may impact and/or be impacted by this project. This work item will include tracking and coordinating with those projects. Projects may include the Middle Truckee TMDL efforts, the Martis Valley and Middle Truckee Cumulative Water Quality efforts, other Waddle Ranch efforts (CA Resources Agency grant work, Truckee River Watershed Council early TMDL implementation work, the Sierra Business Council/IERS Sediment Source Control Handbook and ongoing Truckee Donner Land Trust Waddle Ranch management work. These related efforts will be accounted for within our planning and implementation efforts to the greatest degree possible in an effort to eliminate redundancy and maximize efficiency.

### **Work Item 2: Project Administration (5 years)**

#### **2.1 Quarterly Progress Reports**

IERS staff will produce quarterly progress reports in March, June, September and December that will include all activities undertaken and/or completed, cost tracking, minutes of meetings and other pertinent information. This report will be provided to the 3<sup>rd</sup> party oversight entity for review and submittal to the Water Board. Format of this report will be agreed to in advance by IERS, the 3<sup>rd</sup> party entity and the Water Board staff so that it will contain what is needed in a format that is understandable and acceptable to all parties.

## **2.2 Draft Project Report**

IERS will prepare a draft project report that will include a summary of all tasks listed in this document. The project report will include an introduction section, objectives of the SEP project, and a discussion of the nexus of this project to other related regional efforts and accomplishments both directly and indirectly related to the tasks and lessons learned from this project. The project report will also include the task list and a brief description of task completion. This task includes submittal of the draft project report to the Truckee Donner Land Trust, the 3<sup>rd</sup> party oversight entity, NMP staff, the Truckee River Watershed Council and the Lahontan RWQCB staff for review and comment.

## **2.3 Final Project Report**

IERS will incorporate comments and suggestions as appropriate, from the draft Project Report that have been submitted in a timely manner (30 days from submittal of the Draft Report) and will prepare and submit a final report within 60 days of receipt of the comments from the reviewers or no later than 90 days from submittal of the Draft Report to reviewers.

## **2.4 Project Coordination**

This work item entails general coordination of each project element, coordination between project elements, coordination among project elements and coordination between this SEP and other partner groups. We recognize that coordination and high level communication will be critical to the success of the various elements of this project and thus this general task has been included to support that communication and coordination.

Specific tasks and actions that may be covered by this work item include coordination meetings in-house, phone, web and in-person meetings and communication between partner groups as well as outside entities interested in assisting with this project. Since this project consists of three integrated but individual elements that will likely play a role in other related projects in the Martis-Truckee-Tahoe region, adequate coordination will be crucial. We have not included a specific work item to cover requests for information sharing and presentations outside of Waddle Ranch-specific outreach and tours.

## **2.5 Direct Overhead**

Direct overhead will cover production of copies, travel expenses and expenses related to direct project tracking.



## **Work Item 3: Project Assessment and Evaluation Plan (PAEP) and Quality Assurance and Quality Control (QA/QC) Document**

### **3.1 PAEP Table Preparation**

Prepare PAEP table and iterate elements as a basis for the full PAEP document, as described on Water Board website.

### **3.2 PAEP Document**

Prepare PAEP document per guidance on Water Board website [http://www.waterboards.ca.gov/funding/paep\\_training.html](http://www.waterboards.ca.gov/funding/paep_training.html), as foundation for performance goal setting, indicators and assessment.

### **3.4 PAEP Oversight and Documentation**

Assure coordination between activities and PAEP document, perform annual review and report of PAEP document and submit as part of quarterly report each March for previous year.

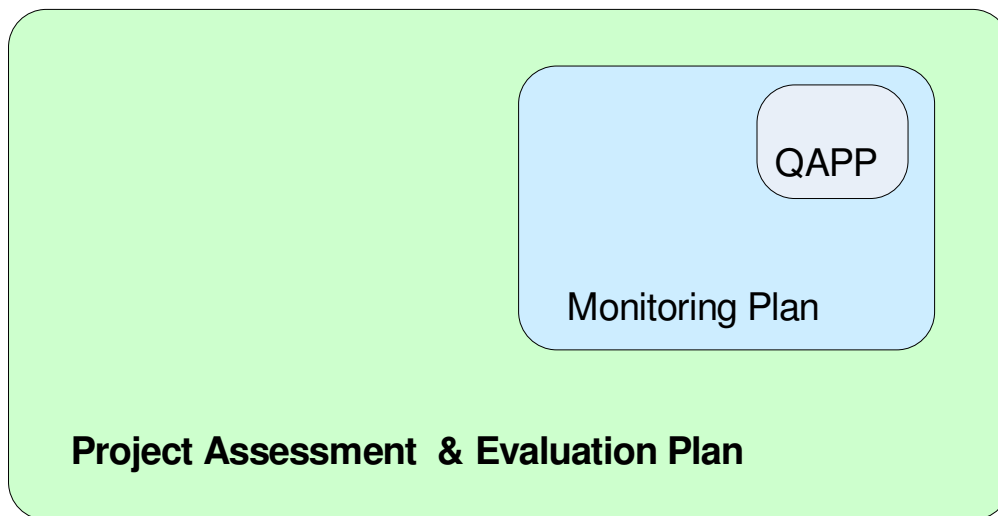


Figure 4: graphic representation of PAEP and its relationship to Monitoring Plan and QAPP per Water Board Guidance presentation.

### **3.5 Monitoring Plan**

Prepare a monitoring plan linked to project goals as described in the PAEP table. Monitoring will be based primarily on real time, soil-sediment source measurements as developed by IERS, UC Davis and others, and as used and reported in the Lake Tahoe Basin TMDL Forest Upland Source Reduction Report (in review.) The monitoring plan will also include water quality monitoring at the top and bottom of the Waddle Ranch property. Monitoring will focus on quantitative, real-time monitoring wherever possible.

### **3.5 QAPP Preparation**

Prepare QAPP plan as described in <http://www.waterboards.ca.gov/swamp/qapp.html> as adapted to this project.

## **Work Item 4: Waddle Ranch Restoration**

### **4.1 Site/Watershed Evaluation (Erosion-focused Rapid Assessment or EfRA)**

The site/watershed evaluation will be developed in order to rapidly assess actual and potential sediment source areas and other areas of degradation as they relate to water quality. Description of the purpose and general explanation of the site/watershed evaluation can be found in Work Item 5, below.

### **4.2 Environmental/Permitting Documentation**

Research and produce information to obtain grading and ground disturbance permits if required.

### **4.3 Treatment Sites Identification**

Use evaluation process to develop a prioritized list of projects based on parameters developed by the SEP Advisory Group and as agreed to by TDLT and/or Truckee Tahoe Airport District Board representative. (Note: the Truckee Tahoe Airport District is scheduled to assume ownership of the Waddle Ranch in 2011-12. Therefore, involvement will be important to insure a smooth transition of this program.)

Identify potential projects to be completed over the lifetime of the SEP with estimated costs for each project.

Develop a working list of projects during fall and winter seasons for the following construction season. The last year of the project, a list of recommended future projects for ongoing work at Waddle Ranch will be produced (to be undertaken after this SEP is finalized).

### **4.4 Permitting Assistance**

Work with and assist Land Owner (TDLT) to obtain permits (in 2010 reverts to TTAD).

### **4.5 Treatment Specifications**

Develop treatment specifications for each restoration and treatment element of the SEP and include those specifications in the year end and final Project Reports.

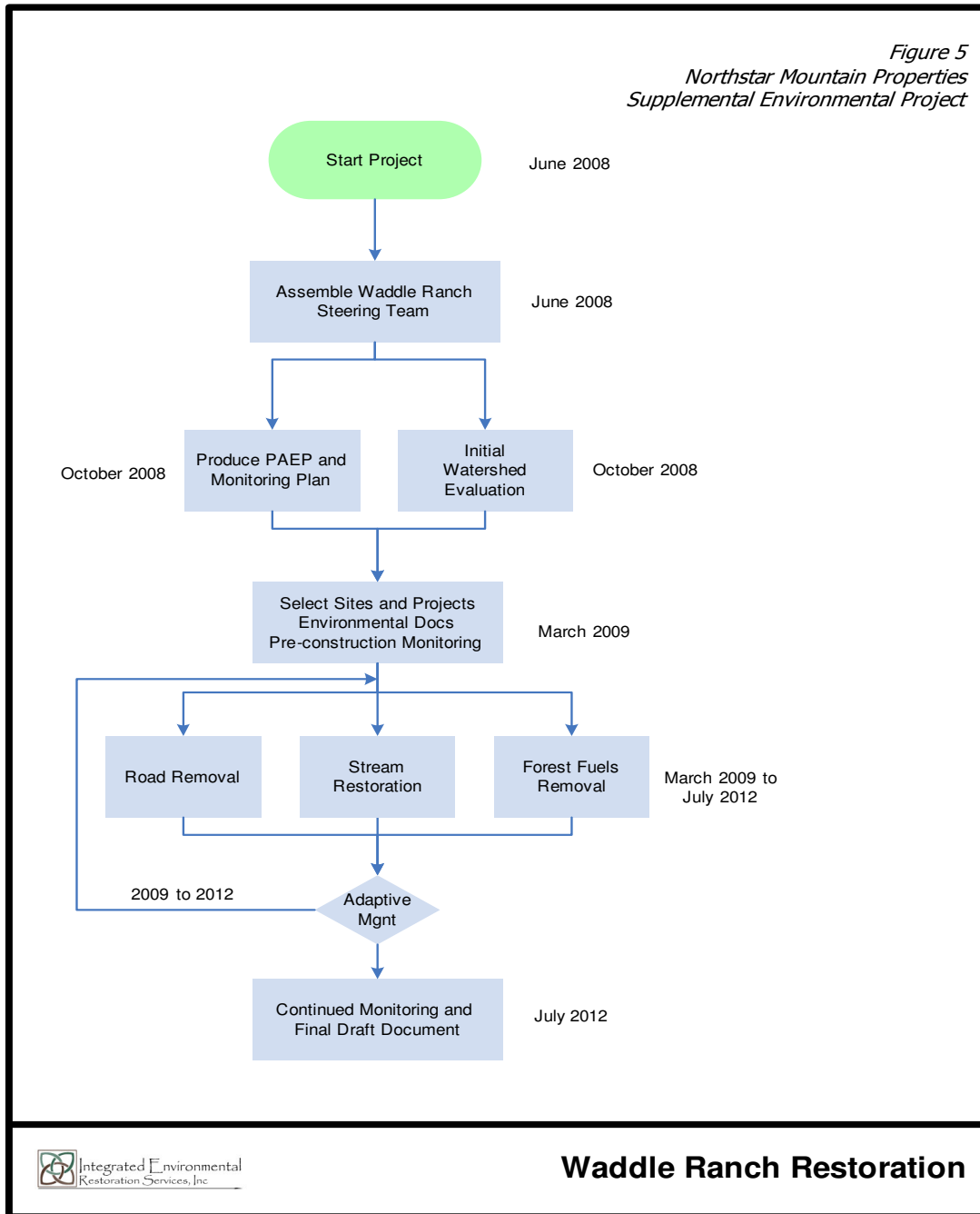
### **4.6 Pre-Treatment Monitoring**

Conduct functional, soil-vegetation-based monitoring including simulated rainfall or runoff monitoring, soil nutrient evaluation, cover point monitoring and others as appropriate in order to assess the pre-treatment condition of treatment sites and to determine level of treatment required to achieve self-sustaining site conditions.

### **4.7 Water Quality Monitoring**

Perform water quality monitoring at top and bottom of Waddle Ranch site or as otherwise needed, but in positions that will identify background conditions to the

greatest extent possible and then will assess post treatment effects (if possible) during the life of the project. Monitoring will include turbidity, EC and other parameters as needed to directly assess sediment load and concentration within East Martis Creek as it runs through the Waddle Ranch property. We do not intend to perform full parameter water quality sampling as described in the Basin Plan or other related documents. The focus of these efforts is on sediment load.



Water quality/sediment monitoring will be used as a reference point for work performed at the Waddle Ranch. The main monitoring emphasis for this SEP will be placed on real-time, sediment source area monitoring.

Grab samples will be taken during runoff periods as needed to assess background and post-project sediment loads. These samples will be used to 1) ascertain whether restoration effects can be distinguished from sampling and if so 2) what effects are. Sampling will be done as described in the QAPP. Generally, sampling will be taken on appropriate limbs of the peak flow hydrograph in order to determine changes over a range of flow regimes.

#### **4.8 Water Quality Monitoring Contingency**

Specific water quality sites and the overall flow characteristics of the watershed will not be well understood until site evaluation begins. This contingency is included in order to reserve adequate funding to respond as needed and as ultimately outlined in the QAPP and monitoring plan. Any monitoring funding not used in the first two seasons will be carried over until at least the third season. Once flow characteristics and monitoring frequencies are adequately understood, budget adjustments will be made. As in other budget elements, any funding not used in this task will be applied to restoration efforts.

#### **4.9 Road Removal**

Remove and/or repair selected roads in the Waddle Ranch that have been identified as sediment source areas. Roads have been shown to be the primary source of sediment in most disturbed watersheds such as Waddle Ranch. IERS has performed extensive road removal throughout the Tahoe Truckee region and will base efforts on that work. Actual amount of square footage will be determined by the type of treatment, extent of removal required and difficulty of treatment sites. Product will be a slope or area re-contoured to original shape as much as possible or in the case of road repair, a road surface that has been designed per BMPs to result in minimum sediment production. Road removal work will be based upon other road restoration work designed and implemented by IERS, including the Ponderosa Ranch projects (2005-06), various USFS-funded projects (2002-2006) and Homewood Mountain Resort projects (ongoing).

#### **4.10 Stream/Wetland Restoration**

Restore stream and/or wetlands on Waddle Ranch property where needed and as identified in the watershed evaluation (EfRA). It is not possible to describe areas or acreage needing treatment at this point. However, discussion with the TDLT and Don Triplat, who produced the Forest Management Plan for TDLT, indicates that several candidate areas exist that are in need of restoration. Exact amount of area treated will depend on difficulty of site, site conditions, etc. Treatments will be based on riparian/stream restoration and wetland restoration designed and/or implemented by IERS, including projects in the Tahoe Basin and two projects in the Martis Valley watershed (West Martis Stream Restoration and Golf Course TH-2 Wetlands Restoration).

#### **4.11 Forest Fuels Demonstration Treatments**

Implement forest fuels reduction treatments using a range of treatment types per SEP Advisory Group direction. This SEP cannot treat the entire forest within the Waddle Ranch property. However, we will apply targeted treatments as models for more broad scale treatments and as a foundation for monitoring those treatments.

Monitoring will help identify potential water quality impacts of those treatments and will help determine mitigation measures when necessary. Note that TDLT has a small, ongoing budget to implement forest treatment and this portion of the SEP will help them identify the most cost- and environmentally-effective treatments available.

#### **4.12 Post-Treatment Monitoring (per PAEP)**

Conduct post-treatment effectiveness (performance) monitoring using some or all of the same monitoring methodologies used in pre-treatment monitoring in order to ascertain relative change in soil function (potential for erosion) and vegetation on those sites. This information and data will be used in PAEP documentation to determine success of treatments. Monitoring data will be compared to success criteria in order to provide a quantitative measure of success.

#### **4.13 Site Tours**

Provide technology transfer site tours to various areas of Waddle Ranch. Tours will focus on restoration processes, monitoring methodologies and results. Invitees to the site tours will be determined by the SEP Advisory Group and approved by the TDLT.

#### **4.14 Public Outreach Program and Materials**

Develop and produce outreach and technology transfer materials for site tours and other needs as identified by the SEP Advisory Group. Materials will include general information on Waddle Ranch and related site restoration activities.

### **Work Item 5: Watershed Evaluation, Treatment and Monitoring Handbook**

Overview: Currently, a large number of watershed assessment documents exist, such as EPA's Handbook for Developing Watershed Plans to Restore and Protect Our Waters<sup>3</sup> and The California Watershed Assessment Guide and Manual<sup>4</sup>. These guides are prepared for watershed groups and agencies and are extremely useful. However, for land managers that are tasked with implementing erosion reduction practices on the ground with limited resources, these assessments can be extremely cumbersome. The **Watershed Evaluation, Treatment and Monitoring Handbook** (Work Item 5), will provide a tactical, erosion-focused approach to watershed assessment and treatment. This assessment approach, referred to as 'Erosion-focused Rapid Assessment' or EfRA, is designed to provide watershed and land managers with a direct, accessible, user-friendly and cost-effective method to identify erosion source areas. That information will feed directly into plans and implementation of repair and restoration efforts.

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<sup>3</sup> EPA 841-B-05-005, October 2005. United States Environmental Protection Agency, Office of Water, Nonpoint Source Control Branch, Washington, DC 20460

<sup>4</sup> Shilling, Sommarstrom, Kattleman, Wahsburn, Florshiem and Helnly, 2005. California Resources Agency and the California Bay Delta Authority

The watershed evaluation itself starts with gathering applicable spatial data for Wattle Ranch and developing a GIS map of the watershed showing pertinent elements such as roads, water courses, soils, vegetation and disturbed areas. Spatial analysis in GIS is then used to identify potential erosion 'hot spots' such as road-stream crossings and areas devoid of vegetation. This map is then used as the basis for focused field investigations. During field verification of potential erosion issues, sediment sources are identified and mapped in greater detail. Site-specific plans for restoring each erosion source area are then developed within the context of that particular drainage. Projects are prioritized by severity and relationship to other sediment issues in their respective drainages. Actual field projects and priorities are then developed for the watershed as a whole.

The need for this type of rapid and directed watershed assessment has been identified over several seasons through working with land managers, agency personnel and other responsible parties. It has become clear that land managers often do not have a background in watershed, erosion or soil processes. That constraint often limits effective action. As TMDL programs are implemented, clear and cost-effective assessment, implementation and monitoring procedures will be critical to achieving the desired results of those programs. This **Watershed Evaluation, Treatment and Monitoring Handbook** is designed to fill the need for such a process and procedure.

## **TASKS**

### **5.1 Watershed Technical Group Development and Meetings**

A small, ad-hoc Watershed Technical Group will be developed to guide this portion of the project. Watershed Technical Group members will be chosen based on their involvement in watershed management issues and their understanding of the use and need for such as handbook. This group will be tasked with providing input and information and developing connections with watershed groups and other entities that need guidance in implementing and monitoring watershed improvement efforts.

#### **5.1.1 Watershed Technical Group Review**

Review and input of Watershed Evaluation, Treatment and Monitoring Handbook by the Watershed Technical Group during development of the document.

### **5.2 Literature Review and Report**

Review related literature and prepare a report on relevant watershed assessment and evaluation documents with emphasis on the role that the Watershed Evaluation, Treatment and Monitoring Handbook fulfills within the range of watershed assessment approaches.

### **5.3 Document Outline**

Prepare a complete outline for the Watershed Evaluation, Treatment and Monitoring Handbook that encompasses the elements put forth by the Watershed Technical Group.

### **5.4 Draft Document**

Prepare and produce a draft document for review by the Watershed Technical Group and other technical reviewers as identified by the Watershed Technical Group.

### **5.5 Interim/Working Document**

Prepare interim working document based on input from the Watershed Technical Group and other reviewers. This document will provide the basis of further work and will be used as a working field document for continued work at Waddle Ranch during the life of this SEP. It may also be made available to other interested parties upon review and agreement by the SEP Advisory Group.

### **5.6 Document Iteration**

Iterate and update document periodically, based on input from users and Watershed Technical Group.

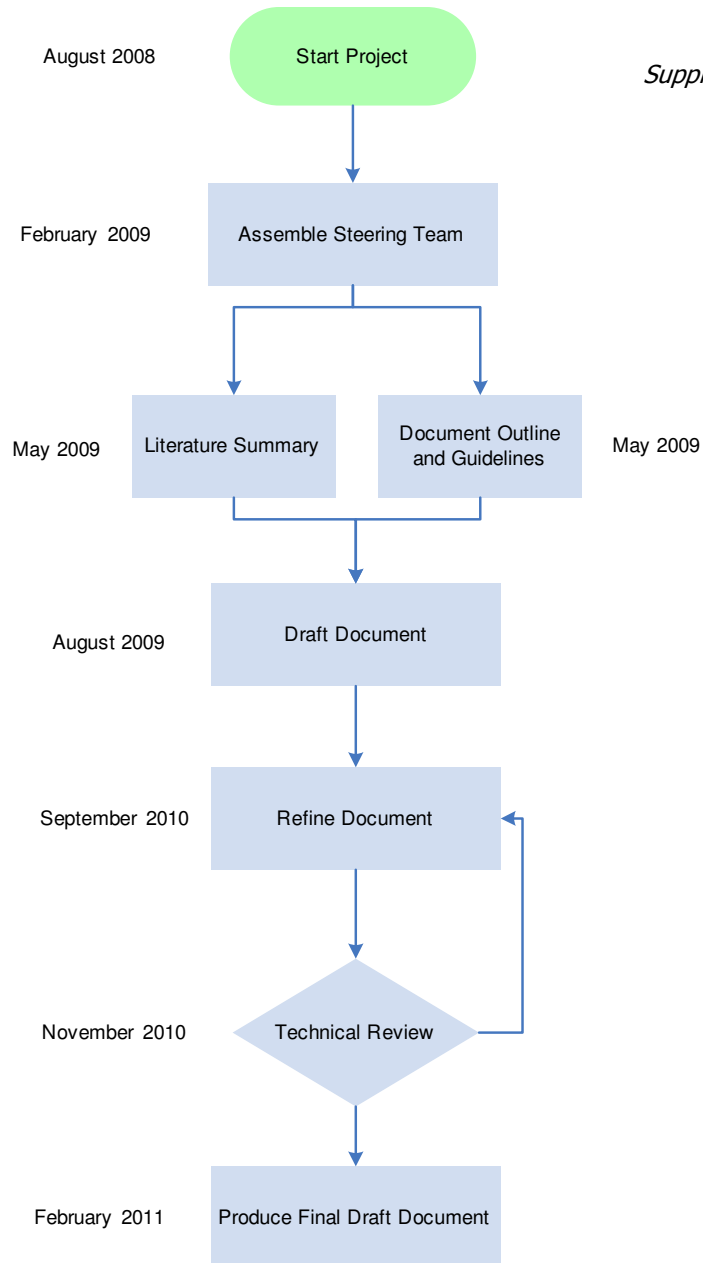
### **5.7 Final Draft Document**

Produce final draft of document based on input from Watershed Technical Group and other users and technical input over the life of the document. Request for final input will be made to reviewers and users. Input will be incorporated when received within 30 days from time of request. Final draft will be produced within 60 days of receipt of input or no later than 90 days from request for input.

### **5.8 Document Layout and Printing**

Professional layout of document and printing costs for 10 hard copies of the document. Other funding will be sought for additional printing as needed.

*Figure 6  
Northstar Mountain Properties  
Supplemental Environmental Project*





## **Work Item 6: Forest Fuels Treatment/Water Quality Protection Handbook**

This portion of the SEP is designed to fill a critical gap in knowledge and process related to forest fuels treatment and water quality. This 'program' is designed to build a bridge between forest fuels treatment and the protection of water quality during and following those treatments. Water Board and fire agency staffs have been vocal supporters of developing such a program, based on the Sediment Source Control Handbook. The handbook produced for this work item will provide land managers/dischargers with much-needed guidance to help them plan, implement and monitor their fuels treatment projects. The overall program, which will eventually extend beyond the Waddle Ranch, is intended to produce a set of tools that land managers can use for fuels treatment that offers a quantifiable outcome and where needed, mitigation treatments that will minimize or eliminate impacts to water quality.

### **6.1 Forestry Technical Group Formation**

Form a Forestry Technical Group made up of fire agency, Water Board, land management staff and other individuals. (Note: this group is separate from both the overall SEP Advisory Group and the Watershed Technical Group.) This group will be tasked with assuring that the project is focused on identified needs and that effective communication occurs with appropriate groups and individual stakeholders. Further, this group will work to make sure that this program is aligned with other existing forestry and fuels management programs and efforts in the region.

### **6.2 Forestry Technical Group Agreement, Goals, and Outcome**

Develop agreement as to the goals and outcome of this effort (charter) through a facilitated process.

### **6.3 Forestry Technical Group Meetings**

Convene Forestry Technical Group meetings twice per year through 2011.

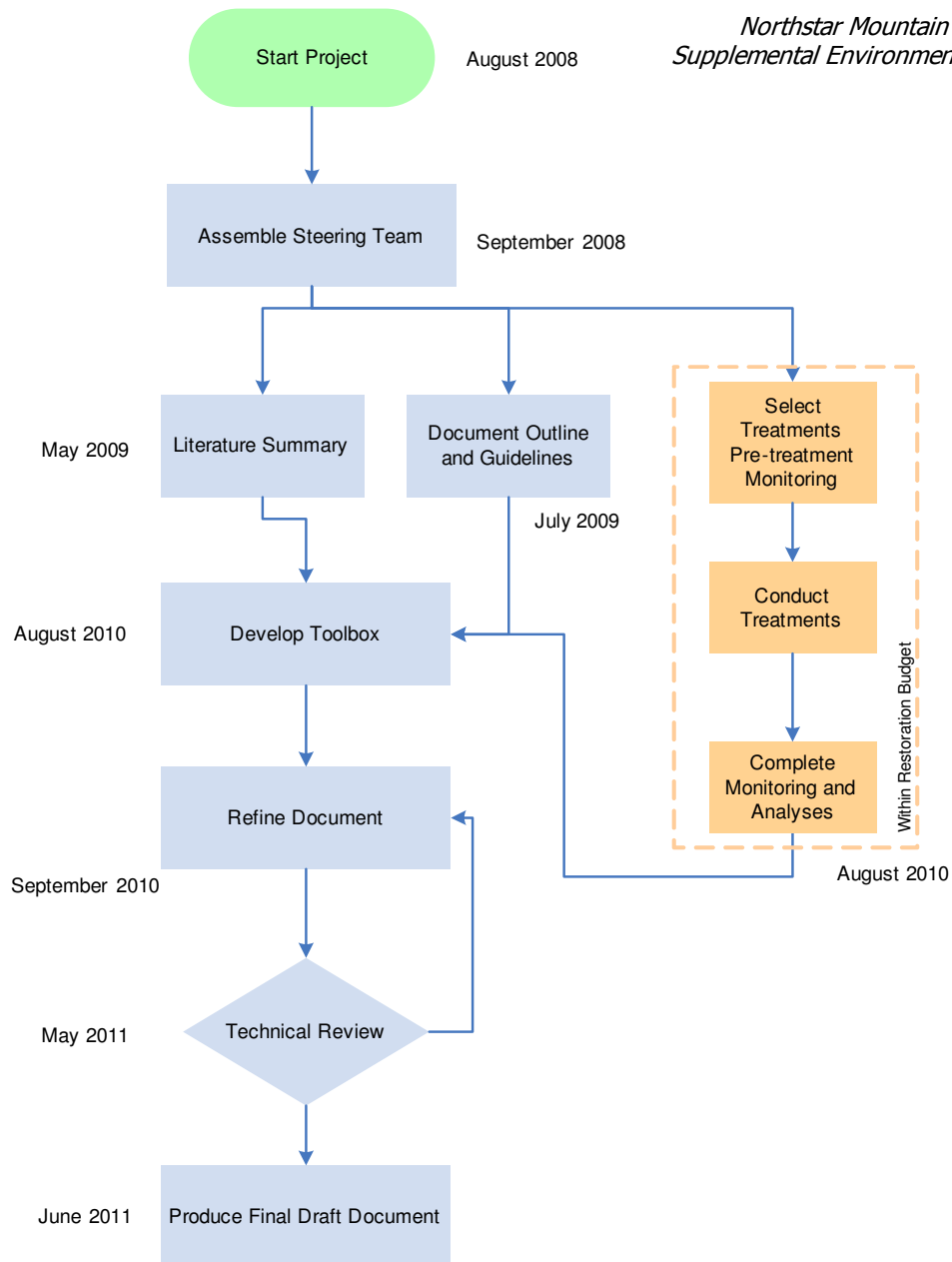
### **6.4 Literature Review and Report**

Prepare a literature report based on review of literature relevant to this program. That report will be produced in hard copy and as a CD ROM. It will also be made available as a web posting either on the TRPA TIMMS site, the Lahontan RWQCB site and/or a number of other fire-related sites. This report will identify the state of knowledge relative to fuels reduction practices effects on water quality. Other literature review efforts currently underway will be incorporated or included wherever possible. IERS has been coordinating with the USFS Pacific Southwest Research Station, the UC Cooperative Extension and the Tahoe Science Consortium on several recent and current literature reviews.

### **6.5 Develop Draft Document Outline and Guiding Principles**

Develop a draft document outline and guiding principles for the final document.

*Figure 7  
Northstar Mountain Properties  
Supplemental Environmental Project*



## **6.6 Identify Treatment Options**

Based on literature review and coordination with management agencies, develop a list of all potential treatment options that may be used on Waddle Ranch. Create a priority treatment list in conjunction with the Forestry Technical Group. The types of treatments chosen will be based on those treatments that represent the most promise from a cost-effectiveness standpoint and the largest knowledge gap relative to impacts on water-quality/sediment production.

## **6.7 Forest Fuels Reduction Treatment Implementation (research plots)**

As identified in 6.6, above, select four treatments and apply those treatments to small (<1/2 acre) areas of Waddle Ranch.

## **6.8 Develop Draft Forest Fuels Treatment/Water Quality Protection Handbook**

Develop draft toolkit for forest fuels treatments. This work item will produce a format for toolkit elements and will include at least four specific 'tools' with related water quality impacts. Tools may consist of such practices as pile burning, broadcast burning, mastication, forwarding, etc. Actual tools will depend on budget and management constraints at Waddle Ranch. Related water quality impacts may include such elements as soil compaction, changed in infiltration rate, runoff volume changes, runoff constituents, effects on vegetation, effects on soil nutrients, etc.

## **6.9 Monitor Treatments**

Treatments shall be monitored both pre and post treatment using similar methodologies to the overall Waddle Ranch monitoring plan. Specific monitoring elements will be adapted to specific treatments and shall be based on monitoring methodologies used for the Lake Tahoe Basin TMDL Forest Uplands Sediment Reduction Strategy study.

## **6.10 Review Copy - Forest Fuels Treatment/Water Quality Protection Handbook**

Produce a draft copy of the Forest Fuels Treatment/Water Quality Protection Handbook and distribute to the Forestry Technical Group for review. Also provide for other technical review as suggested by the Forestry Technical Group.

## **6.11 Draft Forest Fuels Treatment/Water Quality Protection Handbook**

Incorporate review comments and produce a draft version of the Forest Fuels Treatment/Water Quality Protection Handbook. This document will not be finalized under this funding but is intended to tier off of our efforts here and continue under other funding.

## **6.12 Printing and Distribution of Draft Forest Fuels Treatment/Water Quality Protection Handbook**

Funding for the layout and printing of this document is not covered under this SEP agreement. Other entities in the Truckee-Tahoe region have expressed commitment to this program. Some of these other entities will request funding for final layout and

printing of this document. The draft version of the document will be provided on CD ROM to interested parties as suggested by the Forestry Technical Group.

### **Work Item 7: Project Implementation and Monitoring Contingency**

Approximately \$70,000 has been set aside as a contingency over the 5-year life cycle of this SEP. Given the long life cycle of this project and the many variables, both known and unknown, we believe this contingency will be adequate to provide for unknown issues that may arise. Contingency will only be allocated as requested by IERS on behalf of NMP and as submitted to the 3<sup>rd</sup> party oversight entity and then agreed to by Lahontan staff or as otherwise arranged by and agreed to by Lahontan staff. Any contingency not reallocated by request will be shifted to field implementation of restoration on the Waddle Ranch property. If inadequate opportunity for restoration exists on Waddle Ranch property, funds may be reallocated to other Martis Valley or Middle Truckee River watershed efforts in order to retain the nexus between funds and violations in the same watershed.

### **General**

#### **Transfer of funds between and among work items**

Given the nature of this project and the uncertainty at this point regarding exactly where and how much restoration work will be done (the Waddle Ranch site is under snow as this document is being prepared), and in an attempt to most accurately and reasonably target costs, we will adhere to the following guidelines for funding allocation:

-Wherever specific work items do not use all funds allocated to that work item, those funds will be 1) reallocated within the overall work item or 2) reallocated to field implementation wherever possible. If a particular work item is underfunded, reallocation may occur IF approved by the SEP Advisory Group, the 3<sup>rd</sup> party oversight entity and the Lahontan staff member assigned to oversee this SEP. In any event, the cost of the work items and work in total will not exceed the total budget of this SEP.

#### **Finalization of task and work items**

This project is being planned during the winter season of 2007-2008. Specific elements of work items will be finalized by field assessment and site visits. The plan thus far developed has been done so in cooperation with individuals who are familiar with Waddle Ranch and thus these plans can be considered as accurate as possible.

## Part 4: Project Team and Administration

The project team is well balanced in background and capabilities. Given the nature of Waddle Ranch ownership, as well as the nature of water quality monitoring in the Martis Valley, the project team includes members that can guide implementation of the elements of the proposed SEP.

- Lisa Wallace: The Truckee River Watershed Council is the main watershed coordination group in the Truckee region and is involved in many of the watershed efforts that are underway.
- Sarah Taddo, Perry Norris: The Truckee Donner Land Trust is the property owner/manager and is also involved in many of the watershed efforts occurring in the Truckee region.
- Integrated Environmental Restoration Services has a track record of successful planning, implementation and monitoring of environmental restoration and improvement projects throughout the Tahoe Truckee region and has a solid history of cooperative work with the Lahontan Regional Water Quality Control Board, the Truckee River Watershed Council, Placer County and the Truckee Donner Land Trust. IERS team members include:
  - Michael Hogan, MS, Soil Scientist, Restoration Specialist, Principal
  - Jerry Dion, MS, Ecologist, GIS Specialist, Principal
  - Kevin Drake MS, Planner, Associate Project Coordinator
  - Don Triplett, BS, Restoration Coordinator, Forestry
  - Rachel Arst, MS, Environmental Engineer, Monitoring Coordinator
  - Gerald Rockwell (USGS, Ret.) Water quality monitoring, associate

The IERS team will be supplemented as needed. IERS consists of over 25 individuals and four workgroups (Planning, Implementation, Monitoring/Research and general Consulting) which provide adequate resources to complete most of the tasks involved in this SEP.

- Dr. Mark Grismer, Ph.D, UC Davis, Consulting Research Associate, Hydrology and Environmental Engineering. Dr. Grismer has teamed with IERS on a number projects including the Tahoe TMDL Source Reduction work. He will help develop monitoring plans.
- Dr. Susan Clark, Ph.D, Dynamic Competence. Dr Clark will serve as a process facilitator to assure adequate, high level communication and coordination occurs between the project partners and outside stakeholders.

### Third Party Oversight

Third Party Oversight will be provided by Sierra Business Council (SBC). Specific arrangements will be made during or immediately following the finalization of this agreement. Steve Frisch (530.582.4800) has been contacted and has agreed to provide this oversight. SBC is suited to provide these services since it is already providing

similar services for a SEP in the Victorville area and has been working as liaison and contact administrator for the 319 Grant-funded Ski Area Erosion Control Guidelines project with IERS and the Lahontan Regional Water Quality Control Board.

The following is a list of additional proposed ‘adjunct’ project members. Specific individuals may serve as advisory, technical or implementation team members. Specific team organization will take place upon implementation of the SEP project.

- Richard Anderson-Town of Truckee, California Fly Fisher Magazine
- Hayes Parzybok-Northstar Mountain Properties liaison
- Alan Heyvaert-Desert Research Institute
- Kathleen Eagan-Truckee Airport Board
- Jim Porter-Attorney and former Board member of Truckee Tahoe Community Foundation

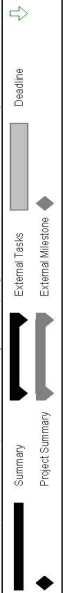
## Part 5: Deliverables Table

The deliverable dates are based on a June 1, 2008 project start date. That assumption is based on the possibility that this SEP will be approved at the May Lahontan Board meeting and that contracting and finalization of the project agreements will take an additional two months. If another start date is implemented, due dates will adjust accordingly. This table can be adjusted and revised accordingly.

Deliverable	Work Item	Due
Meeting agendas, Notes, Minutes of advisory group, Membership list, etc.	1.1-1.4	30 days following end of each quarter, through project life
Quarterly reports, Draft and final report.	2.1-2.3	30 days following end of each quarter, through project life  Draft format and outline, Feb 2012  Final, Feb, 2013
PAEP table, supporting PAEP document, monitoring plan and QAPP documentation.  Ongoing: yearly PAEP implementation report	3.1,2,5,6  3.4	October 15 <sup>th</sup> , 2008  January 30 <sup>th</sup> , each year.
Watershed Evaluation summary document	4.1	Sequential, Each season by July 30th. See budget. Bulk of effort in yr 1, 2.
Project Designs and environmental documentation	4.2-4.4	Design: February prior to construction season, Environmental Doc: Each year, by 60 days prior

# Northstar Mountain Properties Supplemental Environmental Project (Scope, Budget, and Schedule)

ID	WBS	Task Name	Proposed Cost	Duration	Start	Finish	2008	2009	2010	2011	2012	2013
							Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1
1	0	<b>Northstar Mountain Properties Supplemental Environmental Project</b>		1268 days?	Mon 11/4/08	Mon 12/31/12						
2	1.0	<b>Work Item 1: Project development and coordination</b>	\$57,500.00	1153 days?	Thu 5/1/08	Mon 10/1/12						
3	1.1	Advisory group development and facilitation		40 days	Thu 5/1/08	Wed 6/25/08						
4	1.2	Annual group meetings		1153 days?	Thu 5/1/08	Mon 10/1/12						
5	1.3	Group coordination		1153 days?	Thu 5/1/08	Mon 10/1/12						
6	1.4	Review of permit projects		60 days	Mon 11/3/08	Fri 12/3/09						
7	2.0	<b>Work Item 2: Project administration (5 years)</b>	\$110,500.00	1218 days?	Thu 5/1/08	Mon 12/31/12						
8	2.1	Quarterly progress reports		1153 days?	Thu 5/1/08	Mon 10/1/12						
9	2.2	Draft project report		30 days	Tue 10/21/12	Mon 11/21/12						
10	2.3	Final project report		20 days	Tue 11/21/12	Mon 12/10/12						
11	2.4	Project oversight and coordination		1218 days?	Thu 5/1/08	Mon 12/31/12						
12	3.0	<b>Work Item 3: PAEP</b>	\$21,300.00	90 days	Mon 6/2/08	Fri 10/3/08						
13	3.1	PAEP table preparation		30 days	Mon 6/2/08	Fri 7/11/08						
14	3.1.1	QA/QC Preparation		30 days	Mon 7/14/08	Fri 8/22/08						
15	3.2	PAEP Document		30 days	Mon 8/25/08	Fri 10/3/08						
16	3.5	Monitoring Plan		30 days	Mon 7/14/08	Fri 8/22/08						
17	4.0	<b>Work Item 4: Waddle Ranch Restoration</b>	\$1,697,000.00	1278 days	Mon 11/4/08	Mon 12/31/12						
18	4.1	Site/watershed evaluations		352 days	Thu 5/1/08	Tue 5/31/11						
19	4.2	Environmental documentation		40 days	Thu 10/16/08	Wed 12/10/08						
20	4.3	Treatment site identification		30 days	Thu 9/4/08	Wed 10/15/08						
21	4.4	Permitting		60 days	Thu 12/11/08	Wed 3/4/09						
22	4.4	Treatment specifications		30 days	Thu 10/16/08	Wed 11/26/08						
23	4.5	Pre-treatment site monitoring		200 days	Thu 10/16/08	Wed 12/23/09						
24	0	<b>Treatments</b>		1197 01 days	Mon 11/4/08	Wed 8/1/12						
25	4.6	Road removal		471.38 days	Wed 4/1/09	Wed 8/1/12						
26	4.6	Stream/wetland restoration		471.38 days	Wed 4/1/09	Wed 8/1/12						
27	4.6	Forest fuels demonstration treatment		471.38 days	Wed 4/1/09	Wed 8/1/12						
28	4.9	Post treatment monitoring (per PAEP)		780 days	Mon 11/4/08	Fri 10/1/11						
29	4.10	Site tours		200 days	Tue 2/28/12	Mon 12/31/12						
30	4.11	Public outreach program and materials		60 days	Mon 3/2/09	Fri 5/22/09						
31	6.0	<b>Work Item 5: Watershed Evaluation, Treatment and Monitoring</b>	\$57,000.00	233 days	Wed 2/1/12	Fri 12/21/12						
32	5.1	Technical group development: meetings		30 days	Wed 2/1/12	Tue 3/13/12						
33	5.1.1	Technical group development: review		30 days	Wed 3/14/12	Tue 4/24/12						
34	5.2	Literature review and report		40 days	Wed 3/14/12	Tue 5/8/12						
35	5.3	Document outline		10 days	Wed 4/25/12	Tue 5/8/12						
36	5.4	Draft document		68 days	Wed 5/8/12	Fri 8/10/12						
37	5.5	Internal working document		30 days	Mon 8/13/12	Fri 9/21/12						
38	5.6	Document iteration		30 days	Mon 9/24/12	Fri 10/2/12						
39	5.7	Final draft document		20 days	Mon 11/5/12	Fri 11/30/12						
40	5.8	Document layout and printing		15 days	Mon 12/31/12	Fri 1/21/12						
41	6.0	<b>Work Item 6: Forest Treatment and Forest Practices Water Quality Guiding Principles</b>	\$127,000.00	1001 days	Fri 8/1/08	Fri 6/1/12						
42	6.1	Working advisory group formation		60 days	Fri 8/1/08	Thu 10/23/08						
43	6.2	Group agreement, goals, outcome		60 days	Fri 10/24/08	Thu 1/15/09						
44	6.3	Advisory group meetings		100 days	Fri 1/16/09	Thu 6/4/09						
45	6.4	Literature review and report		60 days	Fri 6/5/09	Thu 8/27/09						
46	6.5	Develop draft Guidelines/Guiding Principles		60 days	Fri 8/28/09	Thu 1/19/10						
47	6.6	Identify treatments: options		80 days	Fri 1/23/10	Thu 3/11/10						
48	6.7	Apply treatments		80 days	Mon 5/10/10	Fri 8/27/10						
49	6.8	Develop draft Toolkit		20 days	Mon 8/30/10	Fri 9/24/10						
50	6.9	Monitor treatments		300 days	Mon 9/27/10	Fri 1/18/11						
51	6.10	Review Copy-Forest Fuels Water Quality Guiding Princ.		40 days	Mon 11/22/11	Fri 1/13/12						
52	6.11	Draft Forest Water Quality Guiding Principles		40 days	Mon 1/16/12	Fri 3/9/12						
53	6.12	Printing/distribution of Forest Water Quality Guiding		60 days	Mon 3/12/12	Fri 6/1/12						
54	7	<b>Work Item 7: Project Implementation and Monitoring Co</b>	\$85,700.00	1 day?	Mon 11/4/08	Mon 11/4/08						



(See adjoining budget spreadsheet and Gantt chart, below)





**Northstar Mountain Properties  
Waddle Ranch Watershed Improvement Project**

Work Item #	Description			Total	2008	2009	2010	2011	2012	Total check
<b>Work Item 1: Project Initiation and Coordination</b>		<b>% of total</b>	2.7	<b>\$57,500.00</b>	<b>\$21,000.00</b>	<b>\$10,500.00</b>	<b>\$9,000.00</b>	<b>\$9,000.00</b>	<b>\$8,000.00</b>	<b>\$57,500.00</b>
1.1	Advisory group development and facilitation			\$9,000.00	\$9,000.00	\$0.00	\$0.00	\$0.00	\$0.00	
1.2	Annual group meetings (3)			\$29,500.00	\$6,000.00	\$7,000.00	\$5,500.00	\$5,500.00	\$5,500.00	
1.3	Group coordination			\$12,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	
1.4	Review and iteration of pertinent Martis Valley projects			\$6,500.00	\$3,500.00	\$1,000.00	\$1,000.00	\$1,000.00	\$0.00	
<b>Work Item 2: Project administration (5 years)</b>		<b>% of total</b>	5.1	<b>\$110,500.00</b>	<b>\$14,500.00</b>	<b>\$14,000.00</b>	<b>\$24,000.00</b>	<b>\$27,000.00</b>	<b>\$31,000.00</b>	<b>\$110,500.00</b>
2.1	Quarterly progress reports			\$30,500.00	\$6,000.00	\$5,000.00	\$6,500.00	\$6,500.00	\$6,500.00	
2.2	Draft project report			\$3,000.00			\$1,000.00	\$2,000.00	\$0.00	
2.3	Final project report			\$9,000.00					\$9,000.00	
2.4	Project coordination			\$46,000.00	\$5,000.00	\$5,000.00	\$12,000.00	\$14,000.00	\$10,000.00	
2.5	Direct overhead			\$22,000.00	\$3,500.00	\$4,000.00	\$4,500.00	\$4,500.00	\$5,500.00	
2.5.1	Office supplies			\$0.00						
2.5.2	Copies			\$5,200.00	\$500.00	\$1,000.00	\$700.00	\$1,000.00	\$2,000.00	
2.5.3	travel			\$6,100.00	\$1,200.00	\$1,000.00	\$1,400.00	\$1,500.00	\$1,000.00	
2.5.4	accounting-project tracking			\$10,300.00	\$1,800.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,500.00	
<b>Work Item 3: PAEP and QAPP</b>		<b>% of total</b>	1.1	<b>\$23,300.00</b>	<b>\$17,300.00</b>	<b>\$1,500.00</b>	<b>\$1,500.00</b>	<b>\$1,500.00</b>	<b>\$1,500.00</b>	<b>\$23,300.00</b>
3.1	PAEP table preparation			\$1,200.00	\$1,200.00					
3.2	PAEP Document			\$2,600.00	\$2,600.00					
3.4	PAEP Oversight and Documentation			\$8,000.00	\$2,000.00	\$1,500.00	\$1,500.00	\$1,500.00	\$1,500.00	
3.5	Monitoring Plan			\$4,000.00	\$4,000.00					
3.6	QAPP Preparation			\$7,500.00	\$7,500.00					
<b>Work Item 4: Waddle Ranch Restoration</b>		<b>% of total</b>	78.8	<b>\$1,695,000.00</b>	<b>\$90,000.00</b>	<b>\$103,500.00</b>	<b>\$406,500.00</b>	<b>\$515,500.00</b>	<b>\$579,500.00</b>	<b>\$1,695,000.00</b>
4.1	Site/watershed evaluation (EfRA)			\$61,000.00	\$18,000.00	\$20,000.00	\$15,000.00	\$6,000.00	\$2,000.00	
4.2	Environmental/permitting documentation			\$21,000.00		\$10,000.00		\$5,000.00	\$6,000.00	
4.3	Treatment sites identification			\$30,000.00	\$8,000.00	\$8,000.00	\$4,000.00	\$5,000.00	\$5,000.00	
4.4	Permitting assistance			\$33,000.00	\$4,000.00	\$8,000.00	\$8,000.00	\$8,000.00	\$5,000.00	
4.5	Treatment specifications			\$20,500.00	\$2,000.00	\$3,500.00	\$5,000.00	\$5,000.00	\$5,000.00	
4.6	Pre-treatment sites monitoring			\$120,000.00	\$20,000.00	\$20,000.00	\$20,000.00	\$25,000.00	\$35,000.00	
4.7	Install WQ monitoring equipment			\$60,000.00	\$30,000.00	\$30,000.00				
4.8	WQ Sampling				\$8,000.00	\$4,000.00	\$4,000.00	\$5,000.00	\$10,000.00	
4.9	Road removal			\$465,000.00			\$100,000.00	\$175,000.00	\$190,000.00	
4.10	Stream/wetland restoration			\$540,000.00			\$175,000.00	\$175,000.00	\$190,000.00	
4.11	Forest fuels demonstration treatments			\$140,000.00			\$40,000.00	\$50,000.00	\$50,000.00	
4.12	Post treatment monitoring (per PAEP)			\$125,000.00				\$50,000.00	\$75,000.00	
4.13	Site tours			\$38,000.00			\$30,000.00	\$4,000.00	\$4,000.00	
4.11	Public outreach program and materials			\$10,500.00			\$5,500.00	\$2,500.00	\$2,500.00	
<b>Work Item 5: Watershed Evaluation, Treatment and Monitoring Handbook</b>		<b>% of total</b>	3.1	<b>\$67,000.00</b>	<b>\$23,500.00</b>	<b>\$21,500.00</b>	<b>\$8,000.00</b>	<b>\$4,000.00</b>	<b>\$10,000.00</b>	<b>\$67,000.00</b>
5.1	Technical group development, meetings			\$10,000.00	\$5,000.00	\$5,000.00				
5.1.1	Technical group review			\$7,000.00	\$3,000.00	\$4,000.00				
5.2	Literature review and report			\$9,000.00	\$5,000.00	\$3,500.00				
5.3	Document outline			\$7,000.00	\$6,000.00	\$1,000.00				
5.4	Draft document			\$12,000.00	\$4,000.00	\$8,000.00				
5.5	Interim/working document			\$8,000.00			\$6,000.00	\$2,000.00		
5.6	Document iteration			\$4,000.00			\$2,000.00	\$2,000.00		
5.7	Final draft document			\$6,000.00					\$6,000.00	
5.8	Document layout and printing			\$4,000.00					\$4,000.00	
<b>Work Item 6: Forest Fuels Treatment/Water Quality Protection Guideline Project</b>		<b>% of total</b>	5.9	<b>\$127,000.00</b>	<b>\$27,000.00</b>	<b>\$41,000.00</b>	<b>\$34,000.00</b>	<b>\$25,000.00</b>	<b>\$0.00</b>	<b>\$127,000.00</b>
6.1	Working advisory group formation			\$4,000.00	\$4,000.00					
6.2	Group agreement, goals, outcome			\$2,500.00	\$2,500.00					
6.3	Advisory group meetings			\$20,500.00	\$5,500.00	\$5,000.00	\$5,000.00	\$5,000.00		
6.4	Literature review and report			\$10,000.00	\$5,000.00	\$3,000.00	\$2,000.00			
6.5	Develop draft Guidelines/Guiding Principles			\$12,000.00	\$8,000.00	\$4,000.00				

**Northstar Mountain Properties  
Waddle Ranch Watershed Improvement Project**

[illegible]